DOCUMENT RESUME

ED 350 054 JC 920 510

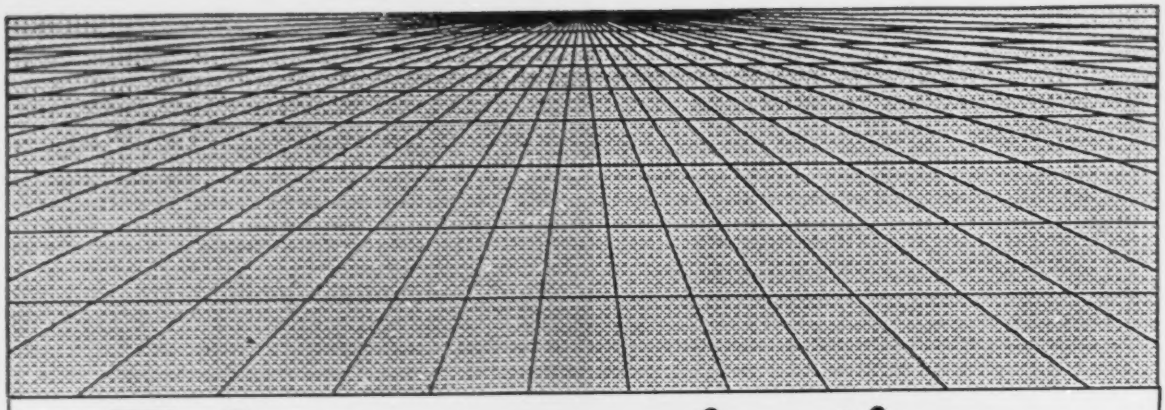
TITLE	Telecommunications: A Paradigm for the Future of Illinois Higher Education.
INSTITUTION	Illinois Community Coll. Board, Springfield.
PUB DATE	Jun 92
NOTE	87p.; A report of the Illinois Community College Board Telecommunications Ad Hoc Task Force.
PUB TYPE	Reports - Descriptive (141) -- Reports - Research/Technical (143) -- Tests/Evaluation Instruments (160)
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	Communications Satellites; *Community Colleges; *Cooperative Programs; Delivery Systems; Distance Education; *Educational Technology; *Educational Television; Guidelines; Information Networks; Models; Networks; *Program Implementation; *Statewide Planning; *Telecommunications; Teleconferencing; Telecourses; Two Year Colleges; Video Equipment
IDENTIFIERS	*Illinois; Telecommunications Ad Hoc Task Force IL

ABSTRACT

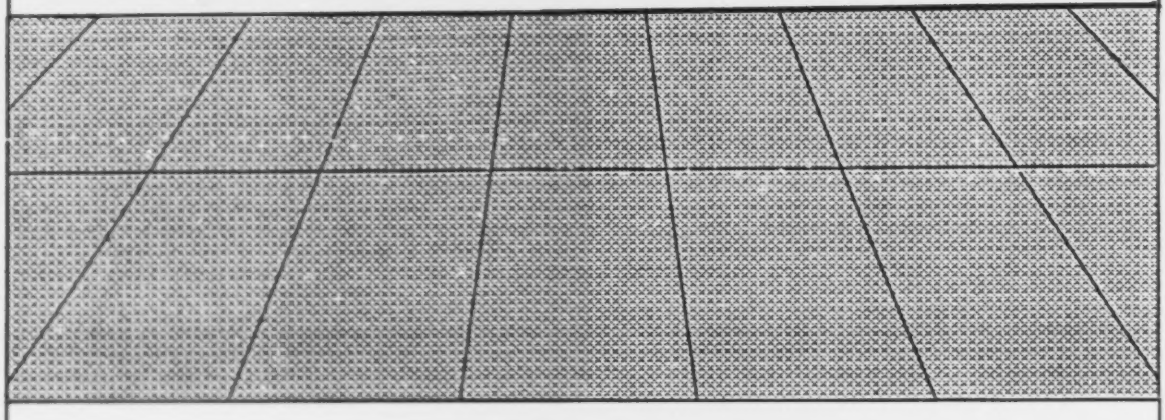
The Illinois Community College Board created the Telecommunications Ad Hoc Task Force (TAHTF) to examine the current status of telecommunications in the Illinois Community College System (ICCS), to determine the feasibility of establishing a statewide telecommunications network, and to recommend policies for the development and use of such a network. This report provides an overview of the TAHTF's activities, findings and recommendations. Introductory material includes a review of the telecommunications policies of the Illinois Board of Higher Education. Next, efforts of the TAHTF are summarized, including its surveys of other states' and Illinois's telecommunications systems. Following a description of current systems in operation in Illinois, issues associated with the need for a statewide network are discussed. Next, 18 areas that would benefit from a statewide network are outlined, including economic development, shared resources, community education, training for business and industry, staff development, student activities, data transmission, guidance and career planning, and the coordination of programs. The TAHTF's recommendations concerning technical standards, costs, funding, education and training, and administration/coordination are then explored. Following a 5-year phased implementation plan, beginning with Fiscal Year 1993, a brief summary of the state's telecommunications needs is offered. Appendixes provide a list of TAHTF members, questionnaires and findings from the national and state surveys, TAHTF's technical networking standards, State University Telecommunications Administrators compressed video equipment standards; estimated costs; and discipline area teaching examples. (MAB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

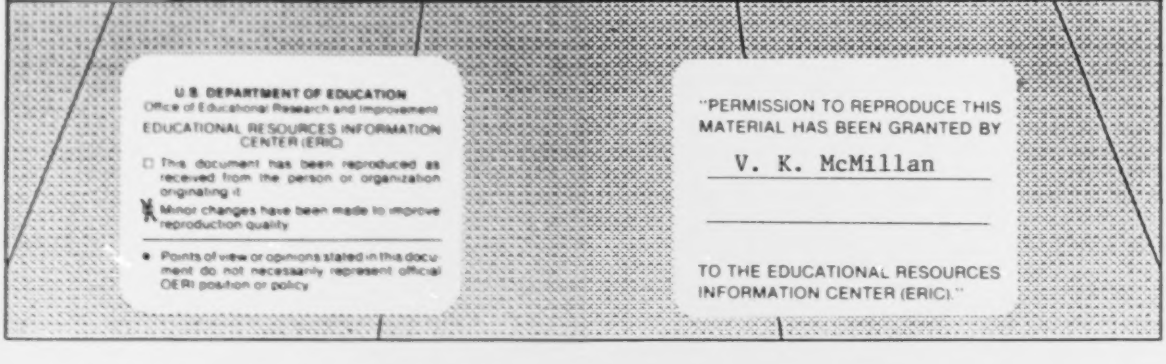
ED350054



Telecommunications



A Paradigm for the Future of Illinois Higher Education



U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☒ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

V. K. McMillan

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

A Report of the Illinois Community College Board Telecommunications Ad Hoc Task Force
June 1992

JC920510

BEST COPY AVAILABLE

TELECOMMUNICATIONS:
A Paradigm for the
Future of Illinois Higher Education

TABLE OF CONTENTS

Introduction 1

Activities in Other States 4

Current Systems in Operation in Illinois 5

Need 6

Benefits 7

Issues 13

Implementation Plan 19

Summary 21

Appendices 23

TELECOMMUNICATIONS:
A Paradigm for the
Future of Illinois Higher Education

Over the past several years, a number of community college districts have either established or considered establishing telecommunications networks to provide off-campus instruction. Different approaches and technologies are being used or considered to offer this instruction. Additionally, several groups in higher education have had committees to examine the feasibility of networks for their particular missions. With the advent of the report of the Illinois Board of Higher Education (IBHE) Committee to Study Underserved Areas, a renewed interest in the potential of using telecommunications technologies for the delivery of education has emerged. Due to the comprehensive service area coverage provided by the Illinois community college system, the IBHE Committee's report identified community colleges as playing a critical role in the development of the statewide network. Under the leadership of Chairman Harry L. Crisp II and Executive Director Cary Israel, the Illinois Community College Board (ICCB) established the Telecommunications Ad Hoc Task Force to address this challenge.

The Illinois Community College Board appointed task force was asked to investigate the educational application of telecommunications in the state of Illinois and investigate the feasibility of developing a statewide telecommunications network. Specifically, the Task Force was charged with the following:

1. To examine the current status of telecommunications in the Illinois community college system;

2. To determine the feasibility of establishing a telecommunications network throughout the state; and

3. To recommend policies regarding the development and subsequent use of the telecommunications network throughout the community college system.

The Task Force consisted of representatives from community colleges, Illinois Community College Board staff, Illinois Board of Higher Education staff, Illinois Department of Central Management Services (CMS), and the business and industry community. Representation was sought from the various constituencies who have examined telecommunications so that their views would be represented and so that the Task Force would not duplicate what had been accomplished by their groups. (See Appendix A for a complete list of Task Force Members.)

In order to establish a common understanding among the Task Force members, the following definition of educational telecommunications was adopted:

> Broadly defined, telecommunications can be described as the electronic exchange of information. **Educational telecommunications** employs technologies such as, but not limited to, microwave, satellite, coaxial cable, and fiber optic cable. The information exchanged via telecommunications can take the form of live interactive video instruction between remote sites, computer-assisted instruction, data transfer for administrative and information services, and voice communication. In a comprehensive educational telecommunications system all of these applications can be realized. While the Task Force recognized the importance of all these aspects of telecommunications, its focus will be on live interactive video instruction between remote sites.

Illinois Board of Higher Education Policy on Telecommunications

Throughout the ICCB Task Force work, the policies of the Illinois Board of Higher Education were used as a guide. In the report of the Committee to Study Underserved Areas which was adopted by the Illinois Board of Higher Education on January 7, 1992, the use of telecommunication systems was identified as a viable means for the delivery of higher education. The specific recommendations regarding telecommunications-based instructional delivery system adopted by the IBHE are as follows:

"1. The development of a telecommunications-based instructional delivery system should be a high priority of the Board of Higher Education and Illinois colleges and universities.

2. Colleges and universities should employ telecommunicationsbased instructional delivery systems when it is cost-effective to do so and when instructional quality can be ensured. Colleges and universities should make more extensive use of telecommunications technologies in the future, and in so doing expand access to instructional programs.

3. A statewide telecommunications-based network should be developed within the following parameters:

   (a) The network design and plan should support the delivery of college and university services to extension sites and off-campus multi-university centers, elementary and secondary schools, and business and industry training sites. The network should also be capable of delivering community services and utilization by the Cooperative Extension Service.

   (b) Telecommunications-based instructional delivery systems should make effective use of existing telecommunications systems including microwave, satellite, and fiber optics.

   (c) The development of telecommunications-based instructional delivery systems should be coordinated with other telecommunications-based networks (e.g., the statewide Central Management Services network and the National Research and Educational Network).

   (d) Community college district networks must be compatible with regional networks which must be compatible with statewide networks. An immediate priority is to establish appropriate and efficient interconnection capabilities which assure compatibility across network hierarchies.

   (e) Local or regional networks which do not provide appropriate and efficient interconnection capabilities to statewide telecommunication systems will not be eligible for HECA matching grants.

4. Colleges and universities should ensure effective use of telecommunications-based instructional delivery systems by faculty and students by disseminating information about the capabilities of these systems and providing faculty opportunities and incentives to effectively utilize them."

The IBHE's report further emphasizes the key role that community colleges will play in the development and implementation of telecommunications technologies. Policy directions adopted by the IBHE include the development of a statewide telecommunications-based instructional delivery system. The statewide system should build upon regional and local systems. The policy directions emphasize the need for local systems to be technically compatible, but do not prescribe any one technology that must be used for each system.

Illinois Task Force on Advanced Telecommunications and Networking

In September 1991, Governor James Edgar created the Illinois Task Force on Advanced Telecommunications and Networking to explore the implication of rapidly changing telecommunications technologies and to foster public-private ventures that assure that government and business will be poised to benefit from new developments in telecommunications technology. Recommendations in this report recognize several initiatives currently underway in the development of telecommunications utilization on a statewide basis. The work of the ICCB Task Force is recognized by this group as one of the initiatives positioned to assist small- and medium-sized companies with their education and training needs.

ACTIVITIES IN OTHER STATES

One of the first activities of the ICCB Task Force was to investigate what is being done in other states. In addition to reviewing the literature, a telephone survey of state community college boards was conducted. Currently, 46 of the 50 states are utilizing or exploring the feasibility of delivering education via telecommunications systems. For example, the community colleges in Iowa will soon be connected by a statewide fiber optic cable backbone. The

community college system in Maine is operated entirely over a telecommunications network through the University of Maine. (A summary of other representative statewide activities can be found in Appendix B.)

CURRENT SYSTEMS IN OPERATION IN ILLINOIS

While a comprehensive statewide approach to telecommunications in Illinois has not yet been realized, there have been a number of successes at the local level. Through a cooperative effort with the ICCB Task Force, the Illinois Council of Continuing Higher Education (ICCHE) conducted a survey to determine how many institutions currently were using or planned on using telecommunications systems to deliver instruction. The results indicate a significant amount of activity in the remote delivery of instruction (see Appendix C for activity in community colleges). As an example, Waubonsee Community College operates a two-way, audio and video, fully interactive microwave system to deliver education to the residents of its district. The Telecommunications Instructional Consortium (TIC) connects Waubonsee's main campus with a campus in downtown Aurora, four area high schools, and the Illinois Mathematics and Science Academy. College credit and high school courses are shared by all members of the consortium. In four years of operation, Waubonsee has served 5,000 students and trained 80 faculty members. An average of 30 college credit courses are offered each semester. Waubonsee also operates a four-channel Instructional Television Fixed Service (ITFS) system which is utilized to deliver telecourse programming to area cable television systems. ITFS is a one-way video/audio transmission medium.

Triton College also uses an ITFS system to deliver college credit, continuing education, and satellite teleconferences to fire stations, nursing home facilities, and local high schools. Telecourse programming to local cable television systems also is facilitated.

Governors State University now delivers continuous instructional programming 24 hours per day to ten cable communities by microwave. In March 1992, the U.S. Federal Communications Commission granted to Governors State a ten-year license for a two-channel ITFS station. The ITFS system will permit a cost-efficient extension of teleclasses and telecourses, videoconferences, and other programming directly to business and industry, school systems, other agencies and organizations, and cable head ends.

The West Central Illinois Educational Telecommunications Corporation operates the CONVOCOM network, an established distance learning system which serves several UHF broadcast stations, community colleges, and public and private universities throughout central Illinois.

The Illinois Institute of Technology uses an eight-channel ITFS system to deliver credit courses from their main campus in Chicago to over 50 corporate and institutional locations around the Chicago area.

A number of commercial vendors have introduced interactive video conferencing systems which may be applicable to education.

NEED

The IBHE's report on underserved areas focused primarily on helping educational institutions meet the needs of the underserved populations in a geographical context. The need to provide educational opportunities to underserved populations is shared by all community

colleges. However, there are other concerns, limitations, and needs that community colleges must address in serving all of their students. The cost of providing quality programs continues to rise. In a time of limited funding, community colleges must look for new ways to utilize scarce resources and dollars. Facilities, faculty, and students can be shared among community colleges. In order to reduce or avoid unnecessary duplication of effort in providing quality programs throughout the state, it will become critical that communication among community colleges is enhanced.

Programmatic applications like those identified in the ICCHE survey illustrate the need for a coordinated approach to the utilization of telecommunications systems for the delivery of education and training.

Locally developed telecommunications-based instructional delivery systems can help educational institutions form partnerships to help address these needs. Partnerships can be formed with other community colleges, public and private universities, local business and industry, and area high schools. Increased efficiency and productivity must be the goal of the investments that are made in these local telecommunications systems. Ultimately, local district and regional telecommunications systems will be linked together to form a statewide telecommunications network.

BENEFITS

The Task Force identified a number of benefits that Illinois community colleges and the state can expect to receive from the establishment of a network of telecommunication systems. While the focus of the Task Force was on a live interactive video instruction network between remote sites, it believes that the benefits of such a network will expand beyond this narrower

focus to the broader definition of telecommunications. Likewise, while the benefits listed below are written from a community college perspective, the Task Force believes that most of these are applicable to other components of the Illinois educational system.

Economic Development

Businesses moving into, starting up, or existing in Illinois often have need for their employees to receive additional skills, training, and other courses. Greater access to education via telecommunications will make rural communities and Illinois a more desirable place for businesses to locate.

Shared Programs

Colleges can and do specialize in program areas where they have unique strengths and expertise. These programs are shared with other colleges. A mutually beneficial program exchange relationship can be developed between colleges linked into a statewide network--thus expanding educational opportunities and reducing costs.

Shared Courses

Credit courses with traditionally low enrollments can be shared over the system between several colleges, making it economically feasible to offer courses that would otherwise be canceled. High cost, low incidence programs such as organic chemistry, second year foreign languages, and specialty languages; i.e. Japanese, become more available through the collaborative efforts of the network participants.

Shared Faculty

Community colleges face a dearth of instructors in a number of disciplines. Institutions can share faculty through the telecommunications system. Also, the special talents of master teachers can be shared with a larger number of students at all networked campuses, thereby enriching the educational learning experience for students.

Community Education

Noncredit community education opportunities can be offered at greatly reduced costs at extension sites throughout each college district via a local telecommunications system. Also, sharing of community education courses between connected colleges will make it possible to expand the range and quality of offerings at all colleges involved. Special presentations by noted experts can be shared by a wider audience.

Training for Business and Industry

Specialized training programs for business and industry can be shared between colleges, reaching a wider audience at less cost. This would be especially advantageous in bringing in high priced outside trainers whose expertise could be shared with a number of colleges simultaneously. It becomes cost-effective to serve small numbers of employees on-site by combining several sites together via telecommunications.

Staff Development

Colleges which are linked can share staff development programs over the telecommunications system. Faculty can conduct discipline meetings without leaving their

respective home campuses. Faculty can also participate in graduate courses offered by upper-division institutions and delivered to sites at community colleges.

Student Activities

Student groups can interact between colleges that are networked. Such activities as College Bowl competition and student government meetings could be held via telecommunications. High profile state and national leaders could be featured as guest speakers and shared among a number of colleges.

Data Transmission

Data systems information, computer assisted instruction, electronic transcripts, assessment data, electronic library catalog information, electronic mail, and a host of other types of computerized data could be shared among colleges in a network. Interactive multimedia instructional packages could also be accessed and placed on the system at reduced cost.

Model Programs

Model program demonstration projects and other types of outreach programs could be disseminated via a telecommunications network. Specialized high school classes could be shared throughout the region and state over a network that is tied in with local secondary schools in each community college district. Faculty from the Illinois Math and Science Academy currently are teaching astrophysics, advanced geometry, and topics in modern physics to the high schools in Waubonsee's district and could transmit these courses to other high schools in the state.

Guidance and Career Planning

Computerized career planning programs, such as the Career Information System (CIS), Guidance Information System (GIS), and Discover, could be shared over a regional network, greatly reducing costs while expanding counseling opportunities for students.

Cable System Access

Colleges linked in a regional and state network would have the potential to access television cable company tie-ins in virtually every community in each college district. High cost programming, either locally produced or commercial, could be placed over an expanded cable network, reaching a large number of individual households, schools, and businesses in each college district. Telecourse enrollment would be significantly enhanced through this application.

Administrative Uses

Administrative meetings, conferences, and workshops can be held over the telecommunications system, eliminating the need for travel and time spent away from campus. Statewide initiatives from governing boards and state agencies can be disseminated in a timely manner.

Access to Satellite

Public Broadcasting System, National Narrowcast Service, and other types of satellite delivered programming could be accessed and broadcast over a telecommunications network at reduced cost to individual colleges. Local programming that is produced for satellite distribution at a community college can be disseminated over the telecommunications network.

Upper-Division and Graduate Courses

Telecommunication systems can bring upper-division and graduate courses to areas of the state that currently are underserved by higher education. Students who can complete their first two years of college at the community college would be able to continue their education via telecommunications. Continuing education courses for working professionals can be brought directly to the workplace and, ultimately, to the home.

Coordination of Programs and Services

Participation in a telecommunications-based instructional delivery system will allow institutions to better coordinate the programs that are available to the students. Partnerships between community colleges and upper-division institutions will ensure that students have access to the courses required to complete their education. The support services needed for these students also can be facilitated and coordinated through the network structure.

Access to National Databases

A statewide telecommunications network will facilitate access to national databases. Illinois citizens will be able to avail themselves of the opportunities presented by the emergence of national networks such as the National Research and Education Network.

Future Applications

Immediately on the horizon is the ability to deliver instruction directly to the home or place-bound student. The programming could originate from any of the institutions in the local

or statewide network. Courses of study can be "custom-designed" to meet the needs of the individual student.

ISSUES

The Task Force identified several issues that need to be addressed in the establishment of a telecommunications network. A combination of commitment of potential users at the local, regional, and state level, plus the availability of shared expertise, will serve as an invaluable catalyst in addressing these issues and in making the statewide system a success. The Task Force believes that the development of telecommunications networks can potentially be hampered by the arduous task of dealing with bureaucratic "redtape." The Task Force recommends that levels of bureaucracy be kept to a minimum, and all parties involved in implementation and operation of any networks facilitate progress by streamlining processes as much as possible.

A number of issues were identified by the Task Force to be significant enough to warrant additional consideration. Technical standards, cost, education and training, administration/ coordination, and funding were addressed in detail by the Task Force. As implementation of the network takes place, network participants will need to address these issues on a local level and in much more detail than is given here.

Technical Standards

Due to the presence of a variety of telecommunications technologies currently available for educational applications, it is critical that issues of compatibility be addressed. Recognizing that local and regional needs and constraints will determine the selection of telecommunications technologies, the Task Force is recommending technical standards to guide this selection. By

establishing technical standards at the local, regional, and statewide levels, system compatibility will exist. Technical coordination of the network development will be achieved through the adoption of these standards. Details of the Task Force technical standards can be found in Appendix D.

Other organizations in Illinois have recognized the need to identify telecommunications standards. The standards recommended by the Task Force have been developed in concert with CMS which currently has an active fiber optic network in the state. The State University Telecommunications Administrators (SUTA) also have been working with CMS to establish technical standards for the codec equipment required to connect with the CMS fiber optic network. The Task Force believes the SUTA standards are compatibile with the compressed video network standards developed by the Task Force (see Appendix E).

In light of the rapidly changing field of telecommunications technology, the Task Force realizes that there will be an ongoing need to review and revise technical standards.

Cost

There are three categories of cost that need to be taken into consideration as institutions invest in telecommunications technology: initial investment in equipment and classroom design, interconnection equipment, and ongoing operating costs. The exact cost of participation in a statewide network is difficult to determine because there are many factors that affect cost and the majority of them reflect decisions that are made at the local level. Among the factors that influence cost are the selection of technology, the number of institutions utilizing the network, and the level of utilization. Shared costs for the utilization of a statewide communications network; i.e. CMS or other network provider, will be determined by the amount of traffic on

the system. In other words, individual institutional costs will decrease as more institutions participate and the dollar amount is distributed among a larger number of users.

The Task Force recognizes the need to share technical expertise to help institutions identify the technology best suited to their individual needs, thus helping them determine initial and ongoing costs for participation in the statewide network. The classroom design required for participating in the network is fairly uniform and can be modified to suit local needs. The costs associated with connectivity to other systems will depend upon the type of equipment and technology selected at the local level. Additional equipment may be necessary to connect different types of technologies. As mentioned previously, the cost of networking at a regional or statewide level is even more difficult to estimate. To provide some insights into potential costs, the Task Force reviewed potential models for networking. See Appendix F for the estimated classroom design and associated costs as well a diagram of a model regional network.

Funding

The initial investment in telecommunications technology could be a problem for many institutions. The Illinois Board of Higher Education plans to make HECA funds available on a matching basis for use in implementing telecommunications at the local, regional consortia, and statewide levels. The Illinois Community College Board will allow advanced technology equipment grant funds to be used as a local match for these HECA grants as well as for local, regional, and statewide implementation. Operating costs will be controlled and supported by individual institutions. It is assumed that other parties to the network such as universities, high schools, and local businesses will share the costs of establishing and maintaining the networks. The Task Force supports these funding efforts and also recommends that additional external

funding from federal or private grants be sought. The Task Force recommends that the Illinois Community College Board Foundation work with IBHE, Illinois State Board of Education, CMS, community colleges, universities, and private industry in seeking additional funding for the statewide network.

The Task Force also recommends that whenever feasible purchasing power be increased by common purchases or bidding and that sharing between institutions and the state be encouraged to decrease costs as much as possible. In addition, the Task Force recommends that the Illinois Community College Board and the Illinois Board of Higher Education develop a process to maintain and distribute information on telecommunications systems as they are planned and implemented.

Maintenance costs including support services, ongoing fixed and monthly costs, and emergency costs should be factored into decisions on systems. The Task Force believes that costs such as an institution's share of monthly line charges will decrease as more institutions participate in the network.

Technology in the field of telecommunications is changing very rapidly. Institutions and agencies should be aware that equipment and systems purchased today will more than likely need to be upgraded and/or expanded in a few years. Thus, the ability to cost-effectively upgrade equipment should be an important variable in selecting the initial system design.

Education and Training

Perhaps the most difficult issue to overcome will be people's perceptions of telecommunications as a delivery mode. Lack of understanding as to the full potential and a sensitivity of the limits of the technology are among the more obvious limitations which will

need to be addressed at all levels. Fears of institutional staff, especially faculty, that the technology is intended to replace staff rather than seeing it as a tool to support or supplement instructional programs, must be addressed.

Boards, administration, faculty, and even the public will need to become aware of the potential use of this technology. The same concerns which were raised when computerized instruction was introduced into the schools also will need to be addressed with this technology.

When faculty members are asked to teach on a distance learning system, their initial reactions vary. Many think their discipline cannot be taught in this manner because of their lecture style, use of audio/visual materials, extensive use of the black board, or their preference for group work. As instructors begin to use interactive telecommunications systems, they understand that most of what is done in a traditional classroom also can be accomplished over a distance learning system. The Task Force believes it is important that faculty involvement be on a voluntary basis. (Examples of how specific disciplines can be taught are found in Appendix G.)

It generally is accepted that use of telecommunications-based instructional delivery has not been a problem for most students. Given the potential attractiveness of the offerings, the opportunity to select from a variety of instructors, the expansion of course and program offerings, and the increased access which the systems will allow, attracting enrollees should not be a problem. If any, the problem with the students will occur if the technology interferes with the visual and auditory presentation of the instruction or if the instructors confine their use of the technology. It is important for faculty to have adequate training before embarking on distance learning instruction. The Task Force suggests that training can be facilitated through the use of the technology itself.

While these issues are challenging, each can be overcome. Sharing of successes and talents is critical to addressing these issues with the least amount of time and effort. The Task Force recommends that the state partially support the cost of making the skills of talented individuals (e.g., experts in engineering, programming, legal, training, etc.) available to all institutions so they can be used on a cost-sharing basis with the local, regional, and statewide systems. In addition, the Task Force recommends that input from the telecommunications industry be sought and shared with the colleges.

Administration/Coordination

At the local level, coordination should rest with the local users. Local community college boards of trustees and the governing bodies of other participants are the most appropriate places to make decisions relative to institutional participation in the system, types of technology to be utilized at the local level, type of faculty involvement, high school and business participation, etc.

On the regional level, the Illinois Board of Higher Education's regional consortia structure to meet the needs of underserved students should be utilized. This initiative will consist of a number of consortia comprised of community colleges and universities across the state which will be addressing regional issues relative to methodology to meet the needs of these service areas. Interconnecting usage, coordination, number and types of offerings, scheduling, regional operational issues, licensing, and other such concerns which relate to maximizing the instructional usage of the system can best be covered by these consortia.

At the state level, it is recommended that a statewide educational telecommunications coordination committee be established for the purpose of ensuring cost-effective development

and utilization of a statewide telecommunications network to deliver instructional programs. The functions of the committee should be to:

- establish priorities and plans for extending the statewide network;
- ensure compatible and cost-effective interconnections of regional networks;
- support institutions in effectively utilizing the statewide network, including sharing information and expertise across institutions and regional consortia;
- develop recommendations for financing telecommunicationsbased instructional delivery systems at the local, regional, and statewide levels; and
- define operational policies and procedures for the statewide network in such areas as scheduling and obtaining "price breaks" through joint purchases.

The make-up of the Statewide Educational Telecommunications Coordination Committee should include representation from all sectors of higher education (i.e., public and private community college and senior institutions). It should include individuals who have special insights and expertise relevant to the development of the statewide telecommunications network as well as faculty and individuals in policy leadership roles. In addition, the composition of the Statewide Educational Telecommunications Coordination Committee should reflect the important role of regional consortia by seeking their nominations of members as well as representatives of the businesses, social/governmental agencies, and elementary and secondary schools they serve.

IMPLEMENTATION PLAN

After consideration of the need, benefits, and issues (including costs), the Task Force recommends a phased implementation plan over the next five years for establishing a statewide

telecommunications network beginning with the establishment of local and regional networks for districts that are already in the planning and implementation stages. Regional configurations are modeled from the Illinois Community College Trustees Association's nine regions. However, community colleges and senior institutions could form alternative regional configurations if these were more natural. The plan outlined below is dependent upon available local, state, and external funds.

Year 1- Fiscal Year 1993

Establish at least 3 local district networks between community colleges, area high schools, and area businesses.

Establish at least 2 regional networks between community college districts, universities, and other interested participants. One network should interconnect existing systems which currently are using different technologies. The second should interconnect local systems using the same technology.

Year 2 - Fiscal Year 1994

Establish at least 8 additional local district networks.

Establish at least 3 additional regional networks.

Interconnect at least 2 regional networks.

Year 3 - Fiscal Year 1995

Establish at least 8 more local district networks.

Establish at least 3 additional regional networks.

Interconnection of at least 2 additional regional networks.

Year 4 - Fiscal Year 1996

Establish at least 8 more local district networks.

Establish the remaining regional networks.

Interconnection of at least 3 more regional networks.

Year 5 - Fiscal Year 1997

Establish remaining 13 local district networks.

Interconnection of all regional networks into statewide network.

SUMMARY

The Illinois Community College Board and the Illinois Board of Higher Education have been coordinating their efforts toward the development of a statewide telecommunications network. The community colleges are in a unique position to take the leadership role in this effort. Every citizen in Illinois lives within the boundaries of a community college district. Our collective mission is to provide access to quality educational programming. A statewide telecommunications-based instructional network will help fulfill that mission.

Increased access to quality programming and information resources will be the major benefit of the statewide telecommunications network. Participation by community colleges in partnership with senior colleges and universities in regional and subsequent statewide telecommunications systems will allow for a more effective use of resources. Rather than try to be all things to all people, community colleges will be able to focus on their areas of specialization and their strongest programs. Local resources will be allocated toward that effort. As a result, access to additional programs will be made available through the telecommunications network.

The first phase toward the ultimate goal of a statewide network is to connect the local systems currently in operation and planned for implementation in the future. By connecting the

local systems, the first regional systems will be formed. A variety of technologies could be interconnected to provide for the transmission of programming to all participants in the network. The ability to interconnect a variety of technologies--microwave, satellite, or fiber optic cable--already exists. This will be critical in order to take full advantage of the systems that currently are in place. This report provides the foundation for a strategy to implement a statewide network. Local and regional systems can then be designed for ease of compatibility toward the ultimate goal of a statewide network. This will allow regional systems to maximize the technical opportunities that may be available to them at the local level. Currently, a region of the state may have excellent access to fiber optic cable, whereas another region may be more efficiently served by microwave. A mix of technologies will be required to build a statewide system that will meet the needs of the educational community in Illinois. Partnerships, sharing, and cooperation will ensure the best educational telecommunications system for all the citizens of Illinois.

Rev. 6/4/92

Appendix A

ILLINOIS COMMUNITY COLLEGE BOARD
TELECOMMUNICATIONS AD HOC TASK FORCE MEMBERS

ICCB TELECOMMUNICATIONS TASK FORCE

Lynn Blakesley
Associate Dean,
Learning Resources & Educational Technology
Waubonsee Community College
IL Route 47 at Harter Road
Sugar Grove IL 60554-9799
708/466-4811
FAX: 708/466-7799

Steve Crady
Director of Audio Visual
Illinois Central College
One College Drive
East Peoria, Illinois 61635-0001
309/694-5011
FAX: 309/694-5450

Donald Drake
Executive Director
Northern Illinois Learning Resources Cooperative
91 Sugar Lane, Suite 4
P.O. Box 509
Sugar Grove, IL 60554
708/466-4848
FAX: 708/466-4895

Zelema Harris
President
Parkland College
2400 West Bradley Avenue
Champaign, IL 61822-1899
217/351-2200
FAX: 217/351-2592

Todd Hart
Video Conferencing Manager
Central Management Services
120 W. Jefferson
Springfield, Il. 62702
217/785-6799
FAX: 217/785-6803

Herbert Lyon
Chancellor
Black Hawk College
6000 34th Avenue
Moline, IL 61265-5899
309/796-1311
FAX: 309/792-5976

Mike McNulty
UNISYS Corporation
Suite 901
1 UNISYS Center
Lombard, IL 60148
708/810-8263
FAX: 309/515-5905

Daniel Petrosko
Director, Educational Technology
College of Lake County
19351 West Washington Street
Grayslake, IL 60030-1198
708/223-6601
FAX: 708/223-9244

Brian Pier
Consulting Manager
Levi, Ray and Shoup
2401 W. Monroe
Springfield, IL 62704
217/793-3800, ext. 709
FAX: 217/787-3286

Samuel Rodriguez
Telecommunications Consultant
7852 W. Cahill Terrace
Chicago, IL 60634
312/625-8029

David Snow
Manager, State Governmental Affairs
A T & T
913 S. Sixth
Springfield, IL. 61703
217/788-6228
FAX: 217/788-6207

John Swalec (Chair)
President
Waubonsee Community College
IL Route 47 at Harter Road
River Grove, IL 60171-9799
708/466-4811
FAX: 708/466-7550

Rita Swiener
State Community College
601 James R. Thompson Boulevard
East St. Louis, IL 62201-1101
618/583-2500
FAX: 618/583-2661

Paul Thompson
President
William Rainey Harper College
1200 West Algonquin Road
Palatine, IL 60067-7398
708/397-3000 (2390)
FAX: 708/397-8996

Robert Wallhaus
Executive Deputy Director
Illinois Board of Higher Education
500 Reisch Building
4 West Old Capitol Square
Springfield, IL 62701
217/782-3442
FAX: 217/782-8548

John Wray
Vice-President
Consolidated Communications
Mattoon, IL 61938
217/235-3360
FAX: 217/258-6877

EX OFFICIO
Virginia McMillan
Deputy Director for Research and Planning
Illinois Community College Board
509 South Sixth Street
Springfield, IL 62701
FAX: 217/524-4981

Appendix B

TELECOMMUNICATIONS ACTIVITIES IN OTHER STATES

TELECOMMUNICATIONS SURVEY OF OTHER STATES

GOVERNANCE

1. Who controls the network? Where is the central location?

2. Who oversees quality control of what is offered via the network?

3. Is the State Board a governing or coordinating Board?

4. What is your security philosophy and procedures?

IMPLEMENTATION

1. When did your network come on-line?

2. Did you experience major problems during implementation of the network? How were the problems resolved?

3. Did you utilize other existing state network services? If yes, what were they.

IMPLEMENTATION continued

4. If you were to implement the network again, what would you do differently?

5. How is software shared within the state?

6. Is the software licensed for the whole state?

FUNDING

1. How is the network being funded?

2. Are there any user fees or charge backs being assessed?

3. Do you sell network services to outside parties?

PLANNING

1. What entity has primary responsibility for planning the direction of telecommunications within the state?

2. Is there a planning document in place? Would you be willing to send us a copy?

GENERAL COMMENTS

State: _____

Name of Contact: _____

Title: _____

Phone Number: _____

TELECOMMUNICATIONS SURVEY

OF

OTHER STATES

JANUARY 14, 1992

TELECOMMUNICATIONS SURVEY OF OTHER STATES

ALABAMA

The state of Alabama has no statewide educational telecommunications network or governance structure in place at this time. The Alabama Commission on Higher Education (ACHE) has taken the lead in policy development to ensure a unified approach to technology development in the state. The lack of a comprehensive planning effort is attributed to a lack of federal and state funding for planning.

Although a statewide network does not exist at present, a plan is being developed to network the community colleges by accessing the state's central supercomputer center. Also, there are a number of regional consortia of institutions providing distance learning courses. Auburn University is planning to replace its videotape delivery of engineering education with a satellite uplink. Troy State University is distributing postsecondary education through a network of cable systems in its region.

ARIZONA

In the summer of 1988, Arizona established the Arizona Educational Telecommunications Cooperative (AETC) a voluntary consortium of representatives from universities, community colleges, elementary, and secondary education. Its purpose is to encourage and advance cooperative planning and development of educational telecommunications in the state and to study the feasibility of a statewide network.

A primary goal of the AETC is to establish a statewide multilevel Technology Integrated Educational Delivery System (TIEDS) to meet the needs of education, business, and the community. A needs subcommittee of AETC has recommended building microwave links and ITFS systems through the main corridors of the state and to implement satellite transponders to reach the remote sections of the state.

As for existing systems, Arizona has an electronic mail system linking its community colleges (19) and the State Community College Board (SCCB). The e-mail system is funded and governed by the Maricopa Community College District. All other entities are linked on a voluntary basis and maintain the cost of phone lines and the send/receive units. There is a four-channel ITFS system operated by Arizona State University in the Phoenix area and a two-channel ITFS system delivering live courses to business and industry in the Tucson area. The Arizona School Services through Educational Television (ASSET) continues to deliver K-12 programming through public television stations.

CALIFORNIA

California has been aggressively pursuing a number of initiatives in the area of educational technology activities.

One of the primary telecommunications systems currently in operation in the state resides at California State University (CSU). All 14 campuses in the CSU system are linked via DATANET using T-1 data lines with full motion analog TV signal capability. The system is used for electronic mail, data transfer, teleconferencing, and distance learning. A number of public high schools and community colleges (about 10) access the DATANET system mainly for distance learning. CSU also uses satellite and ITFS systems to deliver advance placement courses to high schools and training to businesses and local governments.

CSU also has established SUPERNET, a database accessible to high school and community college students and counselors. Through this network a student may obtain information on financial aid, course descriptions, and transfer and articulation requirements.

COLORADO

In 1989, the Colorado legislature created the Statewide Telecommunications Advisory Commission (STAC) to plan for educational telecommunications. In its draft report to the general assembly, the Commission set goals for the state to develop a telecommunications network by 1995. However, Colorado has already made significant strides in networking the various institutions of higher education. All of the community college campuses have the the same hardware systems with DECNET point-to-point linkages using T-1 lines. This facilitates both electronic mail and data transfer between the campuses. The state has entered into a campus software license program with Digital Equipment Corporation (DEC) whereby the campuses have access to various educational software and services such as library databases.

Due to funding problems, any future systems will be built on currently operating technologies. Colorado State University is the host institution, chief uplink, and control center for National Technological University (NTU), which offers technical courses via satellite to businesses throughout the nation. CSU also offers courses, via microwave, to the University of Wyoming and to 100 cities nationwide through an agreement with a national cable television firm. CSU provides videotaped graduate credit courses to employees in business, industry and government and participates with universities in Wyoming, Utah, and Montana in the Inter-Mountain Consortium for Library and Information Services (ICLIS). The University of Colorado has a 12-channel ITFS/fiber network which connects its campuses in Boulder, Denver, and Colorado Springs.

CONNECTICUT

Unlike many other states, much of the telecommunications activity in Connecticut is occurring at the K-12 level and within the state's community college system. In September 1983, the state brought on-line its ITFS system which is used to feed the statewide cable channel to sixteen cable systems and to nine of the seventeen community colleges. About $250,000 was spent to construct the three transmitter ITFS microwave system with one channel. An additional $120,000 was spent to add a second channel at the three transmitter points. A great deal of time and money was saved in building the system because the towers were supplied by the broadcasting stations and the cable systems. Licenses have been obtained for two additional channels scheduled for implementation within a year.

A telephone system called Links for Learning System (LLS) for information retrieval and delivery of K-12 courses is currently operated by the Department of Education and Southern New England Telephone (SNET). The LLS is comprised of a compressed video network as well as a voice mail system for access to computer resources. The DOE plans to use the ITFS system to link all K-12 schools in the state.

DELAWARE

Delaware recently (July 1991) implemented a limited network connecting its community colleges and universities. The network is primarily used for electronic mail and access to various bulletin boards and national/international networks such as Internet and Surnet. Currently in place is a statewide administrative system primarily for data distribution among state agencies. The second phase being planned involves implementation of a similar voice and data network for use by educational agencies. The University of Delaware has installed a KU uplink for the delivery of telecourses to NTU. The University in consort with the Department of Education and WHYY in Philadelphia have plans to link K-12 and postsecondary schools via ITFS.

FLORIDA

The Florida Department of Education established the Florida Information Resource Network (FIRN) in 1977. The main goal of FIRN has been to provide Florida's educators with equal access to the computing resources that serve public education. This has been accomplished by linking all state universities (9), community colleges (28), and school districts (67) to a comprehensive data communications network. As indicated in the accompanying survey, Florida's educational telecommunications utilizes virtually the whole gamut of telecommunications applications available today for data, voice, and video.

In addition to FIRN, Florida has implemented SunStar, a satellite network, with steerable C and KU band satellite receiving dishes in

each of the 28 community college districts. In combination with an uplink facility in Tallahassee and the distribution capability of ITFS and cable, the SunStar network enables the Department of Education to provide live interactive teleconferences that can reach all of the public educational agencies in Florida.

Florida has consistently been ranked one of the top states in the number of schools equipped to use instructional television. There are over 100 active ITFS channels licensed to all the educational institutions (universities, community colleges, and school districts) in Florida. The community colleges enroll over 15,000 students annually in telecourses, placing Florida in the top three states using this method of instruction. The Instructional Television Office has leased over 400 series consisting of over 5,000 programs for use in schools, colleges, universities, and the prison educational system.

KENTUCKY

The University of Kentucky Community College System established, in 1987, a network to carry administrative traffic among its 14 community colleges and the Chancellor's office. Its primary uses have been data transfer, state reporting, electronic transmission of transcripts and access to national/international networks.

The Kentucky Educational Television Authority (KET) funded primarily through the Department of Education, functions as the central independent authority charged with developing telecommunications for elementary, secondary, and post-secondary programming. KET has a statewide network of 15 public television stations and 13 translators, through which the network delivers K-12 instructional programming and college telecourses. The Department of Education is for the content and quality of the programs delivered to K-12 while KET is responsible for technical delivery. KET received $22 million from the legislature to provide KU-band downlinks to every school, college, and university in the state.

MAINE

Prior to 1989 educational telecommunications was practically non-existent within Maine. However, during the past two years there has been a tremendous growth in the utilization of such technologies. With funding from the state legislature and the U.S. Department of Education, the University of Maine at Augusta has coordinated the development of a statewide telecommunications network in cooperation with state government, educational institutions, and business enterprises. The two-channel interactive television system (soon to be a third) distributes educational programming originating from any of the seven university campuses via fiber optic backbone, microwave and ITFS to all university campuses, the six Maine Technical colleges and all high schools. A fiber optic channel provides the university campuses with teleconferencing capabilities.

MASSACHUSETTS

The state legislature established and funded the Massachusetts Corporation for Educational Telecommunications (MCET) as an independent public corporation. MCET operates a statewide telecommunications brokering service for schools, institutions of higher education, state agencies, libraries, and health care facilities. Through its technical assistance program, MCET helps constituent organizations to use existing technology and to plan and implement pilot projects. MCET does not operate any facilities but rather arranges for the use of one-way or interactive video via leased microwave, satellite, telephone lines, or cable television.

Affected by recent state budget deficits, MCET has had to curtail some of its efforts in fostering the development of original educational programming and providing support services to network users. However, planning for expanding services and exploring the use of new technologies continues.

Several colleges and universities are using telecommunications for distance learning. Northeastern University and Boston University use ITFS to deliver engineering courses to industry while the University of Massachusetts transmits courses to NTU members via satellite.

MINNESOTA

In their response to the survey, the Minnesota Community College System stated that in spite of several requests to the legislature, MCCA has not received funding or support for an instructional telecommunications network. Although some efforts at interactive distance learning have taken place they have been regional and spotty at best. The legislature has created the Task Force on Instructional Technology to outline a plan for a comprehensive educational telecommunications system that would interconnect the various regional networks.

MISSISSIPPI

The community college system in Mississippi does not have a telecommunications network in place. The State Board for Community and Junior Colleges has only recently begun working on a plan for developing a telecommunications network.

MISSOURI

The Missouri Coordinating Board for Higher Education has been assigned the task of designing a telecommunications policy for Missouri's higher education institutions. The Board has established a telecommunications task force which is currently in the process of formulating a five year plan to address the future telecommunication needs of the state's higher education system.

The four campuses of the University of Missouri along with eight of

the community colleges have linked themselves via a LAN - the Missouri Research and Education Network (MORENET). MORENET allows users at each of the twelve sites access to computer resources anywhere on the network. MORENET is also linked to Internet. The University built its system on a fiber optic backbone capable of transmitting voice, data, and video among its various sites. Also, satellite uplink and downlink capabilities at the University of Missouri Rolla campus allow participation in the National Technological University (NTU) network. Two-way interactive audio and compressed video capabilities at all four University campuses permit statewide course sharing. Courses in business, engineering, nursing and education have been offerred interactively via telecommunications.

NEW HAMPSHIRE

The New Hampshire Department of Post-Secondary Technical Education oversees the seven two-year technical colleges. Their response to the survey indicates some limited applications of telecommunications, primarily for data transfer and electronic mail. The state has yet to develop a comprehensive telecommunications plan.

NEW YORK

No entity has primary responsibility for planning the direction of telecommunications within the state. Most statewide telecommunications initiatives are occurring within the State University of New York (SUNY) system. SUNY operates the State University of New York Satellite Network (SUNYSAT) which became operational in 1988. It links all 64 campuses of the SUNY system using uplinks at Albany and Utica and downlinks at each of the campuses. The video based satellite system provides a number of capabilities such as telecourses, professional training, and teleconferencing for schools, public and private colleges, and other state agencies.

Various other networks in the state include New York Network, a division of SUNY, which operates a microwave network for the state's ten public broadcasting stations to relay educational programs to higher education campuses and schools. SUNYNET is a digital voice and data network providing telephone and computer links among the SUNY campuses and NYSERNET a research computer network housed at Cornell University.

The New York State Department of Education initiated the Technology Network Ties (TNT) which encourages schools to develop and use telecommunications through their local Board of Cooperative Educational Services (BOCES) unit. There are over 100 local telecommunication efforts in New York many of them operated by a BOCES unit utilizing a wide array of technologies including cable, fiber, and microwave.

NORTH CAROLINA

North Carolina has been actively developing several statewide telecommunications systems, each independent of the other.

The North Carolina Department of Community Colleges has established statewide telecommunications capabilities among its 58 community college campuses through a network called NC-EDNET. It is a voice/video network consisting of production and distribution capabilities and satellite downlinks at each of the 58 community colleges. The network provides access to a number of community cable and educational channels, the ability to produce broadcast quality video, the capability for doing professional level audio-visual productions, and the opportunity to provide curriculum programs in radio, television, and video production.

Another telecommunications system is maintained by the state public broadcasting network which has 10 stations operated by the University of North Carolina and interconnected by a statewide microwave system. The North Carolina Agency for Public Telecommunications operates two networks, an open public events network via satellite and cable systems offering live and interactive coverage of meetings, and a state services network offering interactive programming to more than 170 primary and secondary schools that are receive sites.

OKLAHOMA

Oklahoma has gained a good reputation for educational telecommunications primarily through the aggressive efforts of Oklahoma State University in providing satellite telecourses to high schools across the nation. OSU has superior teleproduction and telecommunications facilities. It has both C- and KU-band satellite uplinks through which it delivers over 700 hours per year of programming to high schools and to National Technological University. Since 1981 OSU has hosted the National University Telecommunications Network (NUTN), an independent consortium of 240 member colleges. NUTN provides non-credit programming and videoconferencing for faculty and staff training and student services via OSU's satellite facilities.

The coordination of telecommunications is shared by the State Board of Regents for Higher Education and the Office of State Finance. The Board of Regents has a Televised Instructional Network, "Talkback Television", which links the state's public and private colleges and universities, junior colleges and technical institutions, as well as business and medical facilities. It uses a combination of fiber optics, microwave, ITFS, and cable systems for delivering 100 courses to 64 sites statewide.

SOUTH CAROLINA

The various telecommunications applications utilized by the community colleges in South Carolina have been guided by the South

Carolina State Board for Technical and Comprehensive Education. Educational telecommunications on the other hand has been guided by the Department of Education working closely with the South Carolina Education Television (SCETV). These two entities provide delivery of almost all educational programming within the state. The ITFS system operated by SCETV currently reaches 587 locations with programming originating in-state or delivered from out-of-state via satellite. SCETV provides programs to secondary schools, postsecondary institutions, law enforcement agencies, hospitals, and state agencies. For teleconferencing, SCETV operates a fully automated audio conference system, a 48-port audio bridge that handles up to 8 meetings simultaneously.

Proposals for future expansion include splitting the 4 existing ITFS system channels to create 8 statewide channels, and to add another 4 channels through a satellite delivery system. The total of 12 ITFS channels would be available to 158 sites, including state agencies and higher education institutions.

TEXAS

The Texas Coordinating Board for Higher Education has developed rules and regulations regarding what telecourses may be offered for credit at Texas universities, colleges, and community colleges.

Community colleges, under the leadership of Dallas County Community College, have been active in offering telecourses, primarily through PBS station KERA and cable systems. The 62 community colleges have a consortium for the acquisition of telecourses. The consortium provides about 14 pre-taped telecourses per semester to 4300 students.

The Association for Higher Education which is active in the Dallas-Fort Worth area has operated the TAGER TV Network, to serve the institutions of higher education. A number of the universities are interconnected by microwave and they offer 230 live graduate courses per year via ITFS, primarily in engineering and business, to 3000 students in the Dallas-Fort Worth area.

The Texas Education Agency (governed by the Texas State Board of Education) by legislative mandate established a Committee on Long Range Planning for Technology. The TEA plan calls for the development of a comprehensive telecommunications network via three four-year phases. Phase one calls for the procurement and modification of hardware and courseware. Phase two will consist of the development of technology use training and certification procedures. Phase three will involve the establishment of delivery systems through cooperation with public television, institutions of higher education, and other entities currently using telecommunications. TEA requested and the legislature passed the Public Education Technology Act calling for a $16.65 million appropriation for the 1990-91 period to implement some of the phase one actions.

TEA has already worked with schools and PBS stations to develop ITV

programming schedules. Many school districts throughout the state are using microwave, ITFS, audiographics, videotape, cable TV, telephone and computer networks to receive and deliver courses. Texas is a member of SERC , and some schools in the state also receive programming from Oklahoma State.

UTAH

Utah is considered to have one of the premiere structures for educational telecommunications in the nation. The unifying force behind the state's effectiveness is the Utah Telecommunications Cooperative, created by executive order to permit all agencies of the state, higher education, elementary and secondary education, county and municipal government, and private sector groups to plan for all state uses of voice, data, and video. The Cooperative is comprised of representatives from the State Board of Regents, the state's four public universities, the State Board of Education, and six government agencies including the State Division of Telecommunications.

Utah has established a number of options in the area of educational telecommunications for distance learning. Much of it is coordinated through the Utah Education Network Consortium whose 18 members advise the Utah Education Network in its development and operation of a statewide, multi-option telecommunications system for the delivery of educational services throughout the state of Utah.

The Utah Education Network carries out its mission through three separate initiatives, EDNET, KULC-TV, and KUED-ITV.

EDNET is an interactive (two-way) audio and video, closed circuit microwave system. It consists of a number of specially equipped studios and classrooms electronically connected together to form a network of interactive audio and video sites located in various communities throughout Utah. EDNET distributes posr-secondary and public education courses, vocational education and continuing medical education to rural and urban communities, faculties and students. EDNET also provides statewide in-service training and teleconferencing as well as access to computer information for use by libraries, data processing departments and telecommunication agencies throughout the state.

KULC-TV, Utah's Learning Channel, is a full power VHF broadcast television station operated by the University of Utah on behalf of Utah's colleges, universities, and public education systems. KULC distributes for-credit college classes to the colleges and universities. KULC also broadcasts more than 2,500 hours of instructional and core curriculum programs to Utah's K-12.

KUED-ITV, a public television station, through a cooperative agreement, provides six hours of instructional programs for

public school students Monday through Friday from 9:00 a.m. to 3:00 p.m. year round. About 250,000 students have access to the instructional programs.

VERMONT

The State Board for Vermont State Colleges, in cooperation with the State Telecommunications Department, implemented a telecommunications network in 1980. The network utilized existing state network services specifically the state police microwave network. The initial thrust of the network was in the area of data transfer, electronic mail, and access to other networks. Voice and video applications have since been implemented.

Vermont Technical College has been the primary force in developing the educational telecommunications system for the state. In 1987, the first demonstration project of Vermont Interactive Television (VIT) was established. The project linked Vermont Technical College to the North County Area Vocational Center in Newport by a T1 line leased from New England Telephone to transmit two-way audio and two-way compressed video. VIT now uses fiber optics to link 6 sites with 16 more sites planned.

WASHINGTON

The 34 community college campuses in the state are interconnected using X.25 for primarily data transfer. Due to the slow speed (9.6K) of the hook-ups between the campuses, the Washington Community College Computing Consortium contracted with Hewlett Packard to complete a study to upgrade the existing network. Hewlett Packard presented their proposed Wide Area Network Design in November 1991.

The existing network is also used for distance learning, electronic mail, and the transmission of transcripts. Future plans include teleconferencing and imaging. Telecourses are transmitted through the state's Communications Technology Center with downlinks located at each of the community college campuses.

TELECOMMUNICATIONS - OTHER STATES

CATEGORIES	AL	AZ	CT	DE	FL	KY	ME	MA	MN	NH	NM	NY
APPLICATIONS												
Bridges to national & international networks (BITNET, NSFNET, etc.)	None			x	x	x	x	x	None	x		x
Bulletin Boards	"			x	x				"			
Computer Conferencing	"				x		x		"			
Data Transfer	"				x	x	x		"	x		x
Distance Learning	"	x	x		x	x	x	x	"	x	x	x
Electronic Data Interchange (EDI)	"			x					"			
Electronic Mail	"	x				x	x	x	"	x		x
Electronic Transmission of Transcripts & Admissions Info.	"	x			x	x	x	x	"	x		
Imaging	"						Planned		"			
Resource Sharing	"				x				"	x		
State Reporting	"				x	x			"			x
Teleconferencing	"	x	x		x		x		"			x
Voice Mail	"		x		x				"			
Voice Networking	"				x				"			Limited
Workgroup Computing	"			x	x				"			
Other	"								"			
HARDWARE												
Type of Service (T1, T3, etc.)				T1	T1,T3		T3	T1				T1
CODEC (Coder/Decoder)												
Modem												Racal
Multiplexor												Racal
Mainframe				BM/UNISY	IBM 3090		ISBN	IBM,CDC		IBM		IBM,DEC
Minicomputer				SUN,RISC	DECK		AT&T	DEC		VAX 6400		DEC
Personal Computer				IBM,MAC	Various		x			IBM Comp		IBM,DEC
Satellite Dishes			x		x		x	x			x	KU Dwnlks
Other												

TELECOMMUNICATIONS - OTHER STATES

CATEGORIES	AL	AZ	CT	DE	FL	KY	ME	MA	MN	NH	NM	NY
SOFTWARE												
Communications/Protocol				Novell	TCP/IP			Kermet		ENET		DECnet
				CrossTalk	RJ			X.25		DECnet		TCP/IP
				TCP/IP	FTP			TCP/IP				IBM SDLC
												IBM SNA
												IBM Bisync
Other												
COMMUNICATIONS MEDIA												
Unshielded Twisted Pair (UTP)				x		x		x		x		x
Shielded Twisted Pair (STP)				x		x		x				x
Coaxial Cable				x	x			x		x		x
Fiber Optic Cable			Voice Mail	x	x		x	x		x	Leased	x
Microwave		x	x		x	x	x	x		x	x	x
Satellite			x		x			x				
Wire Less												
Other												
CARRIERS												
AT&T							x	x				
MCI						x						56K-DDS
SPRINT												
State-Owned					x							
Locals				Diamond	14 Locals	Gentel	Unity			x		56K-DDS
				Bell								
NETWORK TOPOLOGIES												
Star				x						x		x
Bus				x						x		x
Ring					x							x
Ethernet					x			x		x		x
ArcNet								x				
Backbone							Fiber					T1
Other												

TELECOMMUNICATIONS - OTHER STATES

CATEGORIES	AL	AZ	CT	DE	FL	KY	ME	MA	MN	NH	NM	NY
USERS												
K-12			x	Planned	x	x	x					
Community Colleges			x	x	x	x	x	x				
Universities				x	x	x	x	x			x	
Private Sector					x		x				x	
Governmental Entities				Planned	Planned		x				x	
COST												
Start-Up				$250,000	---	$171,000		$850,000				$750,000
Annual Operating Costs			$125,000	$75,000	$6 mil	$60,000	$612,000	$75,000		$23,000		$1.4 mil
Annual Maintenance Costs			$10,000	$15,000	$385,000							$700,000
OTHER ISSUES												
When did network come on line?	N/A		1983	7/91	1977	1987	1989	1987				1989
Software licensed for whole state?	N/A			No	Some	No		Some		No	No	Univ Only
Network Funding	N/A											
User fees/charge backs				x	x	None	x	Yes		None		x
Sale of services to outside parties				No	No	None		None		None		None
State Appropriations			x	x	x		x	Limited		x	x	x
Grants								NSF				
Planning Document/Literature	None	None	None	None	Rec'd	Drafting	Will Send	Drafting	None	None	Rec'd	Rec'd

BEST COPY AVAILABLE

TELECOMMUNICATIONS - OTHER STATES

CATEGORIES	NC	OK	SC	TX	VT	WA	WY
APPLICATIONS							
Bridges to national & international networks (BITNET, NSFNET, etc.)	x	x		x	x		x
Bulletin Boards	x		x	x		x	x
Computer Conferencing			x				x
Data Transfer	x		x		x	x	x
Distance Learning	x	x	x	x	x	x	x
Electronic Data Interchange (EDI)			x				x
Electronic Mail	x		x	x	x	x	x
Electronic Transmission of Transcripts & Admissions Info.		x	x			x	x
Imaging						Planned	
Resource Sharing						x	
State Reporting	x	x	x	Pilot		x	x
Teleconferencing		x	x			Planned	x
Voice Mail						x	
Voice Networking			x				
Workgroup Computing							
Other							
HARDWARE							
Type of Service (T1, T3, etc.)		T1,T3,DDS	56Kb,T1	T1	T1	9.6Kb,56Kb	T1
CODEC (Coder/Decoder)		DS3					
Modem		9600 Baud	DSU/CSU				x
Multiplexor		D4				Phase-out	x
Mainframe			Hitachi	BULL	VAX 8550	x	DEC
Minicomputer			DEC				Various
Personal Computer		Various	Various	Various	IBM, Apple	Planned	Various
Satellite Dishes		Vid netwk				Downlinks	None
Other				Routers			

TELECOMMUNICATIONS - OTHER STATES

CATEGORIES	NC	OK	SC	TX	VT	WA	WY
SOFTWARE							
Communications/Protocol			DECnet	DECnet		X.25	TCP/IP
				TCP/IP		TCP/IP	IBM SNA
				X.25			
Other							
COMMUNICATIONS MEDIA							
Unshielded Twisted Pair (UTP)		D,Vo	Voice	Data	D,Vo	Data	
Shielded Twisted Pair (STP)		D,Vo			D		
Coaxial Cable			Data		D,Vi		
Fiber Optic Cable		D,Vo,Vi	D,Vo,Vi	Data	D	Data	x
Microwave		D,Vo,Vi	x		D	Data	
Satellite		Video	x			Video	
Wire Less							
Other							
CARRIERS							
AT&T		D,Vo	x				
MCI		D,Vo					
SPRINT		D,Vo			x		
State-Owned		D,Vo,Vi	Microwave				
Locals		D,Vo			x		
NETWORK TOPOLOGIES							
Star		x	x		x	x	
Bus				x	x		
Ring							
Ethernet		x	x	x	x		
ArcNet							
Backbone			Microwave			Fiber	
Other							

TELECOMMUNICATIONS - OTHER STATES

CATEGORIES	NC	OK	SC	TX	VT	WA	WY
USERS							
K-12	x	x	x				x
Community Colleges	x	x	x		x	x	x
Universities	x	x	x		x		x
Private Sector		x	x				
Governmental Entities		x	x				
COST							
Start-Up		$15 mil	$400,000				
Annual Operating Costs		$925,000	$189,000			$148,000	
Annual Maintenance Costs			$30,000			---	
OTHER ISSUES							
When did network come on line?	1988	1970-86	1989	1986	1980	1983	11/1/91
Software licensed for whole state?	Per Site	No	No		Yes	Yes	Yes
Network Funding							
User fees/charge backs		Some	None		None	x	x
Sale of services to outside parties		No	None		None	None	None
State Appropriations	x	x	x		x	x	x
Grants							
Planning Document/Literature	Will Send	Drafting	Will Send	Rec'd	None	Rec'd	Will Send

Below is a list of 2-letter state abbreviations for easy reference:

Alabama	AL	Nebraska	NE
Alaska	AK	Nevada	NV
Arizona	AZ	New Hampshire	NH
Arkansas	AR	New Jersey	NJ
American Samoa	AS	New Mexico	NM
California	CA	New York	NY
Colorado	CO	North Carolina	NC
Connecticut	CT	North Dakota	ND
Delaware	DE	No. Mariana Islands	CM
Dist. of Columbia	DC	Ohio	OH
Florida	FL	Oklahoma	OK
Georgia	GA	Oregon	OR
Guam	GU	Pennsylvania	PA
Hawaii	HI	Puerto Rico	PR
Idaho	ID	Rhode Island	RI
Illinois	IL	South Carolina	SC
Indiana	IN	South Dakota	SD
Iowa	IA	Tennessee	TN
Kansas	KS	Trust Territory	TT
Kentucky	KY	Texas	TX
Louisiana	LA	Utah	UT
Maine	ME	Vermont	VT
Maryland	MD	Virginia	VA
Massachusetts	MA	Virgin Islands	VI
Michigan	MI	Washington	WA
Minnesota	MN	West Virginia	WV
Mississippi	MS	Wisconsin	WI
Missouri	MO	Wyoming	WY
Montana	MT		

Source: United States Postal Mailers Guide and the Consumer's Directory of Postal Services and Products.

BEST COPY AVAILABLE

Appendix C

TELECOMMUNICATION ACTIVITIES IN ILLINOIS COMMUNITY COLLEGES

December 13, 1991

To: Vice Presidents of Instruction

From: Janet Lessner, Chair
Remote Delivery Task Force
Illinois Council on Continuing Higher Education

John Swalec, Chair
Task Force on Telecommunications
Illinois Community College Board

Re: Educational Telecommunications Survey

The enclosed survey represents an effort by the Illinois Community College Board and the Illinois Council on Continuing Higher Education to support the ongoing development of mediated instruction and remote delivery technologies in higher education in Illinois. We believe that the numerous groups currently studying the issue will be well-served by the data we are collecting.

The survey will take no more than a few minutes to complete. We urge you to direct the form to the appropriate person(s) on your campus so it can be completed and returned to us by January 20.

We will share the results with you when they are available. Thank you for your cooperation in this effort.

GENERAL INSTRUCTIONS FOR COMPLETING SURVEY

PART I asks you to identify media and remote delivery technologies your institution currently uses or plans to use to **originate** instruction and administrative conferencing. Indicate if the technology is used on-campus or off-campus. For off-campus uses (current and planned) indicate the type of delivery site (e.g. high school, branch campus, industrial site, library, etc.) you are using or plan to use.

PART II asks you to identify technologies you use to **receive** instruction from outside providers (e.g. NUTN, NTU, PBS.) For each technology you use, list your program provider(s) and indicate whether you use these programs to serve on-campus or off-campus students.

PART III is optional and gives you an opportunity to describe innovative applications of technology you have developed.

If you have questions about the survey, contact Janet Lessner, Quad Cities Graduate Study Center: telephone - (309) 794-7376; FAX - (309) 794-1905.

USE OF EDUCATIONAL TELECOMMUNICATIONS: PART I--**ORIGINATION**

Institution:_____

Person completing survey:_____

Title_____Phone_____

For each technology fill in **I** for ORIGINATION of Instruction, **A** for ORIGINATION of Administrative conferencing or **B** for Both. Leave blank if the box does not apply. Indicate type of off-campus sites for current and planned technology applications.

TECHNOLOGY	NOW USING ON CAMPUS	PLAN TO USE ON CAMPUS NEXT 3-4 YEARS	NOW USING OFF CAMPUS	CURRENT OFF CAMPUS DELIVERY SITES	PLAN TO USE OFF CAMPUS NEXT 3-4 YEARS	PLANNED OFF CAMPUS DELIVERY SITES
TELEPHONE						
AUDIO CASSETTES						
VIDEO CASSETTES						
AUDIO-GRAPHICS						
CABLE TV SYSTEMS						
BROADBAND: 1-WAY VID						
1-WAY VID/ 2-WAY AUD						
ITFS: 1-WAY VID						
1-WAY VID 2-WAY AUD						
2-WAY AUD/ VIDEO						
MICROWAVE: 1-WAY VID						
1-WAY VID/ 2-WAY AUD						
2-WAY AUD/ VIDEO						
COMPR'D VID: 1-WAY VID						
1-WAY VID/ 2-WAY AUD						
2-WAY AUD/ VIDEO						
SATELLITE UPLINK						
INTERACTIVE COMPUTER						
OTHER (specify)						

(OVER)

BEST COPY AVAILABLE

PART II: **RECEPTION**

For each technology identified in Part I, list those you use to receive instruction from outside providers, identify the provider and indicate whether you receive the program at on-campus or off-campus sites.

TECHNOLOGY	PROVIDER	ON-CAMPUS	OFF-CAMPUS

PART III: Optional description of innovative uses of technology:

RETURN SURVEY BY JAN. 20 TO: Janet Lessner, Quad Cities Graduate Study Center, 639 - 38th St., Rock Island, IL 61201

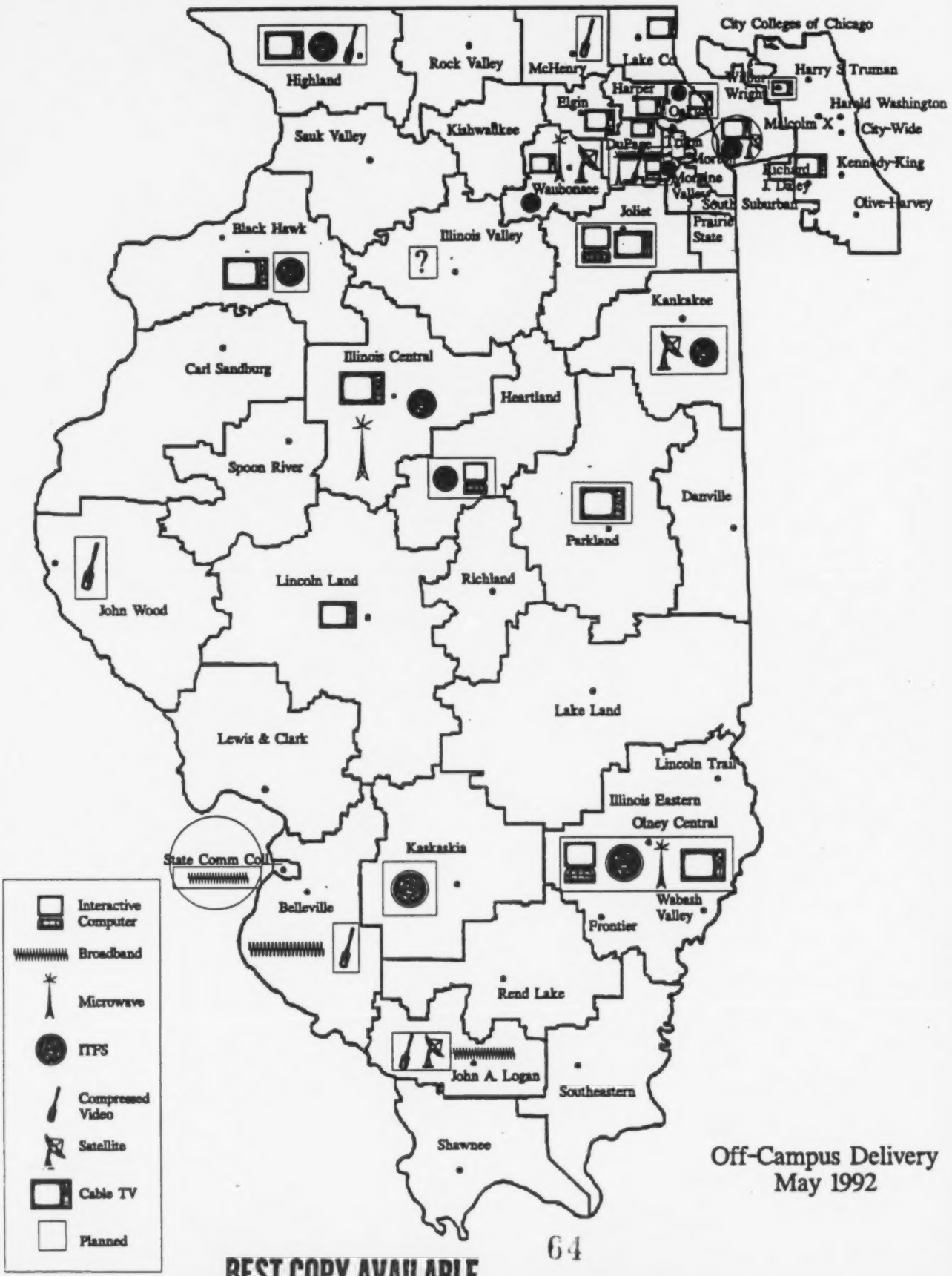
SUMMARY OF CURRENT AND PLANNED TELECOMMUNICATION USAGE
FOR INSTRUCTIONAL DELIVERY
IN ILLINOIS PUBLIC COMMUNITY COLLEGES

TYPE	ON-CAMPUS		OFF-CAMPUS	
	USE	PLANNED	USE	PLANNED
INTERACTIVE COMPUTER	11	3	0	4
BROADBAND	2	2	2	2
MICROWAVE	3	3	2	2
ITFS	3	5	3	8
COMPRESSED	0	6	0	6
SATELLITE	6	1	2	2
CABLE TV	11	4	10	6
UNDECIDED		1		1

SOURCE: ICCHE TELECOMMUNICATIONS SURVEY

4/1/92

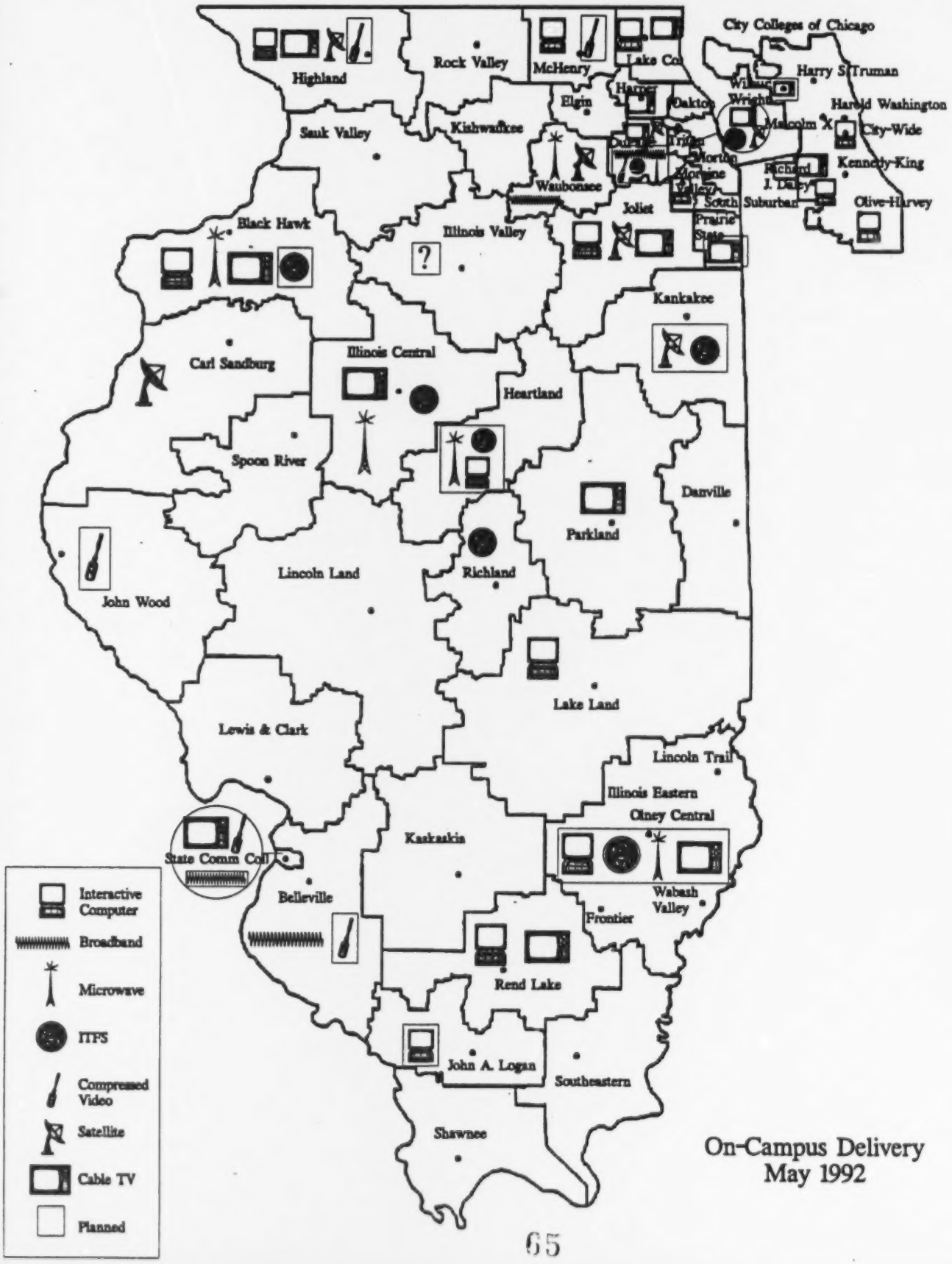
Telecommunications Technologies in Community College Districts



Off-Campus Delivery
May 1992

BEST COPY AVAILABLE

Telecommunications Technologies in Community College Districts



Appendix D

TECHNICAL NETWORKING STANDARDS

An Operating Standards Proposal for the Statewide Telecommunications Network

Serving

Community Colleges and Universities in Illinois

Prepared By

The Illinois Community College Board
Telecommunications Task Force

April 1992

Introduction

The Illinois Community College Board Task Force on Telecommunications has completed an outline of communications system requirements specifically designed for distance learning and data transmission on a state wide basis. The continuing efforts of the Task Force have evolved into establishing an operational philosophy for the Statewide Telecommunications Network. This philosophy stipulates that the distance learning network in Illinois consist of:

> Full motion,-full duplex video and voice telecommunications (by definition requiring two channels each) with a data channel operating at of 56 kbps. Bandwidth of transmission media will depend upon technology available and bugetary and technical constraints in the individual institution's area.

The specific system technical requirements for local, regional, and statewide telecommunications are presented here in detail. Among the many concerns in proposing standards, interconnectivity between regions remains as one of the most important. Our recommendation addresses this concern in detail.

Local Telecommunications

Local telecommunications standards would serve the communications needs of a community college district and associated high schools. This network would be highly interactive (full duplex communication at all levels) and self-contained within the district served.

NTSC VIDEO APPLICATIONS

Where cost effective, DS-3 (T3) broadcast grade video is recommended for distance learning at the local level. Full duplex operation of the NTSC network at the local level will be limited to 45 Mbps. Codecs assigned to 45 Mbps (DS-3) use will provide four 1.544 Mbps (T1) overhead channels within the composite 45 Mbps transmission rate.

1 Full motion, full duplex video processed at compression rates of 2:1 will meet NTSC applications and SMPTE requirements for broadcast television.

2 Distance learning audio would be supported by a minimum of 2 audio channels (contained within the transmitted signal) processed for a transmission rate of 64 kbps, contained within the composite 45 Mbps (DS-3) channel.

3 Operation of the local network should be automated through the use of remote site switching functions for audio and video control. Control signals will be contained within one of the 1.544 Mbps (T1) channels and limited to a transmission rate of 9600 bps.

4 Data transmission rates of 56 kbps will be contained within one of the 1.544 Mbps (T1) overhead channels or multiplexed within the composite 45 Mbps (DS-3) transmission.

COMPRESSED VIDEO APPLICATIONS

Conference grade video is the recommended alternative where DS-3 (T3) transmission rates are not cost effective for distance learning applications. Video signal compression rates of 10:1 or greater processed at 30 frames per second or less will be called 'conference grade' video.

1 The local network must support codec transmission rates up to 1.544 Mbps (T1).

2 Operation of the network should be automated through the use of remote site switching functions for audio and video control. Control signals will be contained within the composite 1.544 Mbps (T1) transmission or a side channel, and limited to 9600 bps.

3 Distance learning audio at the conference grade level will be supported by a 64 kbps transmission and multiplexed within the composite 1.544 Mbps (T1) channel.

4 Data transmission rates shall be determined by user applications. Data transmissions should be supported to 56 kbps or at a cost effective rate defined by the application.

Regional Telecommunications

Regional telecommunications would include the interconnection of community colleges and universities to neighboring community college districts through leased carriers and/or private communications networks that meet the transmission requirements. Selected channels of communication would feature bi-directional transmission to locations beyond the regional level.

1 Two independent channels of bi-directional video and audio communications are recommended to link community colleges to each other within regions. One channel within this link will remain available for the distribution of information on a state-wide level.

2 All community colleges and universities will have the option for originating information regionally and providing state wide distribution. This option will be acomplished through user initiated and automated switching. Switching signals will be transmitted at 9600 bps and should be multiplexed within the composite 1.544 Mbps (T1) or 45 Mbps (DS-3) channel.

3 One channel of the regional link would allow the selection of local distance learning locations for bi-directional transmission of video and audio information between college districts.

4 The selection of NTSC or Conference Grade video will be determined at the local telecommunications level and will also establish the regional transmission rates (1.544 Mbps to 45 Mbps) between community colleges.

5 Converting Transmitted video formats from Broadcast Grade to Conference Grade and from Conference Grade to Broadcast Grade will be completed at the baseband (analog) video and audio signal levels.

6 Bandwidth dedicated for data communications between community colleges within regions will be determined by the user and the application. The data channel will support a minimum transmission rate of 56 Kbps.

Statewide Telecommunications

Statewide distribution of information would be an extension of the regional telecommunications model. Video and audio information distributed at this level would include presentations and special event teleconferences.

1 The statewide telecommunications network will support transmission rates of 56 kbps, up to and including a maximum of 45 Mbps (DS-3).

2 Regional links to the statewide network will independently establish the selection of 56 kbps, up to and including 45 Mbps (DS-3) transmission rates. The selection of a transmission rate will depend upon the telecommunications development of a region at its local level.

3 Regional links employing 45 Mbps (DS-3) transmission for Broadcast Grade video applications may add compressed video or expanded data applications through the use of T1 transmissions multiplexed within the composite 45 Mbps (DS-3) channel.

4 The statewide telecommunications network must support a data transmission rate of of 56 kbps or as defined by the user.

Appendix E

STATE UNIVERSITY TELECOMMUNICATIONS ADMINISTRATORS COMPRESSED VIDEO EQUIPMENT STANDARDS

SUTA VIDEO TELECONFERENCING AND DISTANCE LEARNING COMMITTEE
PROPOSED COMPRESSED VIDEO EQUIPMENT STANDARDS

The following proposed standards are based upon extensive review and evaluation of the video codec equipment on the market combined with the multitude of applications defined at the college and university setting for video services. The proposed standards are provided to help identify equipment that will allow agencies to select a level of service that will meet their needs while providing a high quality of service. It was felt, by the committee, that certain applications would drive the quality of service and the equipment should be adaptable to meet all present and future applications.

REQUIRED STANDARDS

1) The codec must have at least one PX64 model with a network interface of user selectable bit rates ranging from 64kbps to 1.54 Mbps.

2) All codec must conform to the CCITT standards of:
   - H.261 video coding standard
   - H.221 communications framing
   - H.230 control and indication signals
   - H.242 call set up and disconnect
   - H.320 requirements for narrow-band width system (interoperability)

   The unit must operate in both F-CIF and Q-CIF.
   The codec must be a working model not a beta unit.

3) The multipoint control (MCU) must be a working model capable of sustaining a PX64 codec.

DESIRABLE STANDARDS

Video

Frame rate: 30 frames per second
Automatic Standards Conversion: NTSC/PA2 formats
Forward error correction
Motion compensation

Selectable motion video resolution

Proprietary mode: 165,000 or greater luminous resolution (lines times pixels)
CCITT FCIF mode: 288 lines x 352 pixels
CCITT QCIF mode: 144 x 178 pixels

Audio

Audio compression conforming to G711, G722 standard
7.0 kHz preferred
Wide band audio processing

Network Interface

Clock rate - 1.544 Mbps minimum
Date rate - 64 kbps to primary rate
Line code - AMI/B8zS

Data

9600b/s data port conforming to H.221 (1 minimum)
768 kbps data port conforming to H.221 (1 minimum)
DES encryption
Still picture transmission
Remote diagnostic capability
Remote monitor and control interface capability
Black burst signal output
Picture-in-picture capability
Picture multiplex/full resolution functions

Multipoint Control Unit (MCU)

Full duplex audio
Switching: voice activated, chairman control
4 port minimum
8 port standard
10 plus port preferred
Cascade 2 minimum

Other

Upgradeability: ROM firmware cartridge or software
Upgradeability: No charge first 12 months
Full unit warranty: 24 months preferred

Appendix F

ESTIMATED TELECOMMUNICATIONS COSTS

Estimated Terminal Costs for the Proposed Distance Learning Classroom and Telecommunications Model

Classroom Equipment Cost

- Three Video Cameras with Remote Control of Focus and Pan Operation
- Voice Activated Microphone System
- Six Video Monitors
- Audio/Visual Equipment : Video Cassette Recorder, Compact Disc Player, Audio Cassette Recorder
- Telephone and FAX Machine
- Instructor Microphone System

$ 23,300.00

Selection of Codec

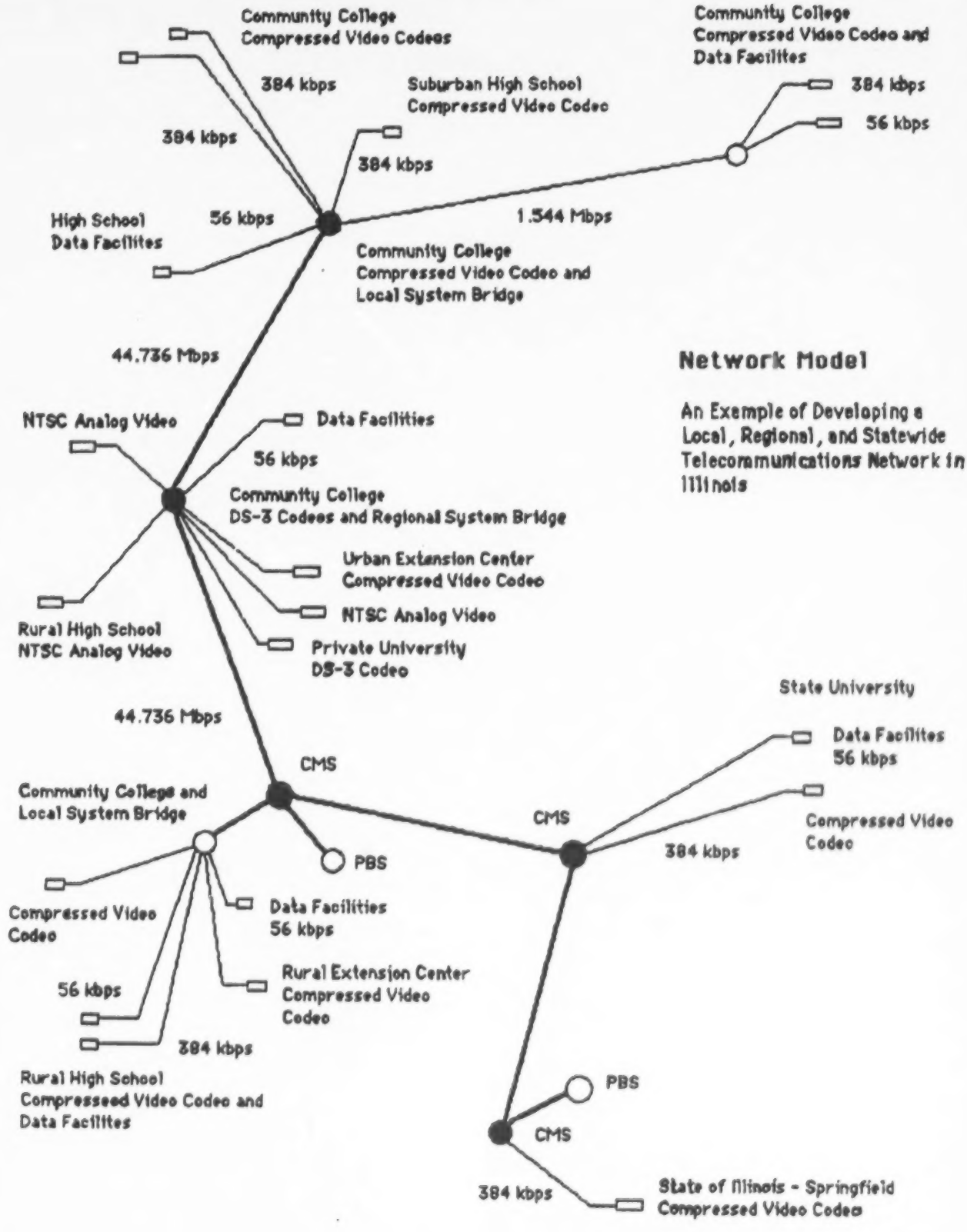
- 384 kbps Processing (1/4 T1 Compressed Video) Including Software to Perform Remote Switching with Network Multiple Channel Unit (MCU) — **72,500.00**
- 45 Mbps Processing (NTSC Broadcast Grade Video) Including Hardware to Perform Switching with Selected Local and Regional Networks — **48,000.00**

Data Communications Equipment

- 56 kbps Channel Sending Unit (CSU)
- 12 Port Statistical Multiplexor — **8,500.00**

Estimated Total Cost for T1 Standard — **$ 104,300.00**

Estimated Total Cost for DS-3 Standard — **$ 79,800.00**



BEST COPY AVAILABLE

Appendix G

DISCIPLINE AREA TEACHING EXAMPLES

Foreign Language Classes

Teachers of foreign language have many concerns about teaching a class on two-way interactive television. Initially, their greatest concern is that their students may learn to read the language but not speak it. How will students learn to say the new vocabulary? Can they hear it well enough to reproduce it? Don't they need to see my lips, tongue and teeth for pronunciation? Students are usually reluctant to speak a new language. Will students be even more intimidated because they have to use a microphone and speak in front of people at receive sites?

Students will learn to speak, read, and write a foreign language in an interactive classroom. Instructors learn to use a close up shot of the face when introducing new vocabulary. As in any class, four or five repetitions follow. Students will use microphones to repeat the new words in a group. Eventually, each student repeats the vocabulary alone. Film strips can be used in the normal fashion with the class camera and student microphone being used to transmit the message. Teachers can put the filmstrips on videotape so they don't have to tend to the machine. This allows time for checking work in the classroom. The teacher can send audio tapes for students to do group work and study at home.

The written language is presented using an overhead camera. Colored pens can help point out irregular patterns of grammar. The overhead can be used for photographs from magazines with vocabulary words superimposed to teach language without using the native tongue. Foreign language teachers often use the flip chart method for introducing grammatical rules. The overhead camera can be used for converting a simple tablet to a flip chart. The teacher prepares this ahead of time and refers to the needed page.

Cultural lessons are enhanced by the overhead camera taking close up shots of pictures from books, maps, and reference materials. Videotapes and movies can be shown easily. Many times when three or four sites are combined for one class, resources increase. It may be easier to find a native speaker as a guest lecturer.

Daily and weekly testing can be achieved by the use of a fax machine. Immediate turn-around time is important because of the skill building nature of language learning.

Math Classes

Instructors of mathematics wonder how they can teach mathematics without the use of at least three blackboards. In the interactive television classroom, the overhead camera can be used to write out a problem. Most instructors learn to write with a felt tip marker on a yellow legal pad. They adjust their camera to photograph a legal size page and also learn to adjust their penmanship size. Some faculty members express concern that students cannot see all three pages of the problem at the same time. Students can be sent hard copy of important problems that are prepared ahead of time. In the traditional classroom students often struggle to read the blackboard. In the interactive TV classroom all written work is on a clear monitor. Many classrooms have monitors placed at the third and fifth rows of the room. Math instructors can put their calculators on the overhead so students can view the teacher's input and results of the calculation. Students frequently remark how they like seeing how the teacher arrives at an answer. Statistics classes benefit from demonstrations that everyone can see using dice or drawing lots. Charts and graphs are also clearer with the overhead camera which allows the use of many colors for visual clarity. Because Math is often a high anxiety area for students the additional benefit of a tape of each class helps students who need extra review.

Social Science and Humanities Classes

Social Science and Humanities classes are traditionally taught in a lecture format at the college level. Most of us have experienced the sixty or seventy-five minute lecture where students just listen and take notes. This can be done on an interactive system as it is in the traditional classroom. Students, however, may find this too impersonal. Teachers are encouraged to make these classes more interactive. Class discussion, student presentations, films, slides, and on-going question and answer sessions foster learning and keep the television classroom interesting. Teachers who have changed from the lecture format to the more interactive approach for television classes often change their approach in their traditional classes. History classes can show photographs of the persons referred to from books not required for the class. Students can see maps not on a far away wall but on a monitor. The teacher can zoom in on the exact city or body of water being discussed. Psychology classes can do close up demonstrations. A subject being hypnotized can be seen in a close up view and wide angle view. Graphs with color overlays can be used to teach test results. Demonstrations of lab animal behavior can be seen by each student while sitting at their desk. Group discussion and feedback can be ongoing.

Any class can be taught on an interactive TV system. Instructors need to become familiar with the classroom so the technology becomes a tool of instruction. The more interactive a class is, the more the student will feel involved in the learning process. Students who are busy learning will forget about the mode of instruction and the technology will become visible. The instructor need not be charismatic, dynamic, or gorgeous. A good television class needs an instructor who is willing to organize the class, set and meet objectives, and foster interaction.

Accounting Classes

Accounting instructors traditionally use an overhead projector to go through past homework or teach a new lesson. Some instructors have replaced this format by using a computer model to teach new principles. Both these methods of instruction can be tailored to work in the interactive television classroom. The challenge Accounting teachers face is adjusting the width of a page projected so it can be viewed in entirety on a TV screen. Teachers must redesign Journal and Ledger forms and practice with overhead camera adjustments. Using a camera and monitor is much clearer than the fuzzy black and white image of an overhead projector. Monitors can be placed in the front and sides of Accounting classes so all students can easily see. Most importantly, students no longer are sitting in a dark room taking notes. Technology also allows for a computer image to be transmitted to TV monitors offering the same benefits.

Speech Classes

Speech instructors have long used audio visual equipment in their rooms. Students are videotaped doing presentations so teachers can make an accurate check on content, delivery, and timing. Students, too, can see their presentation as their audience did and make the necessary adjustments. In the interactive classroom students are videotaped without a conspicuous camera staring them in the eye. Equipment is more permanent and of better quality. In addition, the fact that students are learning to run and present on an interactive system prepares them for the audio and videoconferencing they will be experiencing in their future work place.

Business Classes

Classes in the Business department vary in their presentation style. Classes such as Introduction to Business often have a lecture format. In the interactive television classroom a teacher who lectures is encouraged to become more interactive. Use of the overhead and student cameras can enhance a lecture by providing clear notes, visuals and group work. In an interactive television classroom the class can be taped. Tapes benefit busy adult learners, students who need review and the instructor who may want to view them for self-critique.

A class like Business Statistics is more like a Math class. In the traditional classroom an overhead projector is used for graphs and math calculations. In the interactive classroom an overhead camera makes the visuals clearer, shows color, and can zoom in on detail. Students benefit from many monitors in the room and the well lighted environment for notetaking.

In Business classes that focus on management, instructors usually study communication styles. What you say to someone in person, on the phone, or on an interactive video system, may sound different, look different, and feel different. Students have the opportunity to learn effective communication techniques while using the technology of the work place.

Child Care Classes

Child Care teachers spend much classroom time on lecture of child development theory. When a Child Care class is put on an interactive television system it is important that students have the opportunity to comment, relate experiences, and brainstorm new ways to handle difficult situations. The instructor can put the classroom camera on in both the origination and receive sites and come out into the student area and work on class discussion. In addition, students learn how to create and use interest centers for children to learn new experiences. In the traditional classroom interest centers are placed on a table and everyone comes up and stands around it. In the interactive classroom students remain seated while the class camera photographs the center using the zoom lens and pan/tilt capability to show students the components and details of the center.

Criminal Justice Classes

In the field of Criminal Justice many students are already employed in the field. Some students work as security guards, county police or in investigation offices. It is imperative that classes be offered both days and nights and that they be accessible. The interactive television classroom gives Criminal Justice teachers the ability to show one training film to many sites or communities. It also allows communities to do resource sharing. The Chief of Police in a city could present to personnel in smaller surrounding communities. The taping of classes helps the worker of different shifts stay in school and keep up with the work. Teachers can present to many schools on life saving issues of Drinking and Driving, House Security, and Drug Prevention.

Special Interest Classes

One of the primary benefits of distance education is that it saves time. Time is money. When attending programs the student saves travel time and travel money. A course that previously could not fit into a student's schedule may now be accessible. In short, classes are now more accessible and affordable for the student.

There is also a benefit to the organization originating the programming. If a community college district or a business organization gives a presentation they may need to hire many instructors to reach all the areas in their district or community. This is especially true if the information is timely. With an interactive television system more people can be reached by a single presenter. Businesses use teleconferencing to save airfare and time. Colleges can use interactive television to disseminate information more quickly, reduce the expense of multiple presenters, and meet the needs of distant audiences.

Some classes that can be presented in a timely manner in the instructional television classroom are ACT preparation workshops, tax seminars, and satellite teleconferences.

Meetings

Organizational meetings are part of everyone's work day. An interactive television system can reduce the time spent traveling to meetings. With an interactive classroom in each school, faculty members and staff who are more "home" bound can participate more easily in meetings. Teachers and staff cannot easily leave during the school day because they are running the daily operation of a school. Imagine an afternoon meeting of all the foreign language teachers in a district. In forty minutes and no travel time teachers can share their "tricks of the trade." Some sample discussions include:

- methods for checking understanding
- learner centered activities to teach grammar
- how to teach reading techniques
- swap shop of favorite games and activities

In forty short minutes many people can become aware of contact people near them, some of the resources available, and can leave the meeting with something they can use in their classroom.